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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/086,544	03/04/2002	Yutaka Arima	08372.0007	2264

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EXAMINER	
HIRL, JOSEPH P	

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2121	

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9

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/086,544	ARIMA, YUTAKA	
	Examiner	Art Unit	
	Joseph P. Hirl	2121	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 March 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 June 2002* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-13 are pending in this application.

Request for Information

2. In accordance with 37 C.F.R. 1.105, please provide all related information concerning the material cited in the IDS of June 4, 2002. Specifically each of the IDS documents must be fully translated since each document bears significantly on the disclosed invention. Further, all related documents such as those cited in the IDS documents (i.e. Ch 3, pg 2 re "Chapters 4-6 associative performance") of whatever media including published dates or dates related to briefings to others should be provided in a translated to English form.

Specification

3. Page 10, lines 1 and 4: provide a brief discussion of each figure.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 8, 10, 11 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 8

The terms "desire result" and "answers for a purpose" are relative terms and render the claim indefinite.

Claim 10

The terms "like sensory organs or muscles" and "sources of information processing within the computer" are either relative terms or so non specific as to render the claim indefinite.

Claim 11

The terms "abstract state", "sensory organs like eyes and ears or raw pattern signal outputs to muscles like vocal muscles and those of hands and legs or secretory organs for a specific role to implement an interface with the outside world, and relating a raw pattern from various sensory organs to an abstractive, specific symbol pattern", "answers for a purpose" , "degree of activation" and "some of the pattern" constitute relative terminology and renders the claim indefinite.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Para 10 below applies to the examination.

7. Claims 1-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Study of Associative Memory Analog Neural Network LSI with Learning Function (SAMANN) in view of Chaos and Associative Memory (CAM) (Yutaka Arima, Higher Integration of Neural Network with Learning Function, Study of Associative Memory Analog Neural Network LSI with Learning Function, referred to as **SAMANN**; Chaos and Associative Memory, referred to as **CAM**).

Claim 1

SAMANN teaches an associative memory-based computer, comprising at least one associative memory, a plurality of associative data memories capable of temporarily holding input or output data of said associative memory, and a value judgment device receiving part of the data held in said plurality of associative data memories (**SAMANN**, p 1, line 26; Examiner's Note (EN): this is a Markus type claim and only one example of prior art referenced to one of the cited group is required to establish anticipation).

Claim 2

SAMANN does not teach associative memory is formed of a chaotic neural network. CAM does teach associative memory is formed of a chaotic neural network (**CAM**, page 3). It would have been obvious to one of ordinary skill in the art at the time of the invention to create a chaotic neural network by taking a dynamic system which has a dense collection of periodic points, is sensitivity to the initial conditions and is topological transitive and make adjustments internal to the neural network and the coupling coefficients. The modification would have been obvious because one of ordinary skill in the art would have been motivated to seek improved functionality by simulating biological models.

Claim 3

SAMANN teaches a function to modulate a threshold value of a neuron forming the associative data in accordance with a fired frequency of the relevant neuron (**SAMANN**, Fig. 3.1; EN: Vref is a threshold value; attribute data is frequency data; Fig. 3.1 is an associative neuron).

Claim 4

SAMANN teaches wherein the modulation is carried out by decreasing the threshold value of the neuron in proportion to the fired frequency thereof (**SAMANN**, Fig. 3.3; EN: Vdd can be adjusted) .

Claim 5

SAMANN teaches associative data memories include a first associative data

memory sending/receiving data directly to/from said associative memory, and a plurality of second associative data memories sending/receiving data to/from said associative memory via said first associative data memory (**SAMANN**, Fig. 3.2; EN: inputs and outputs of the synaptic circuit).

Claim 6

SAMANN teaches a function to modulate a threshold value of a neuron forming the associative data in accordance with a fired frequency of the relevant neuron (**SAMANN**, Fig. 3.2; EN: binary function which is either on or off).

Claim 7

SAMANN teaches the modulation is carried out by decreasing the threshold value of the neuron in proportion to the fired frequency thereof (**SAMANN**, Fig. 3.2; EN: binary function which is either on or off; going from on to off is decreasing the threshold value).

Claim 8

SAMANN teaches value judgment device receives part of the data in said first associative data memory to evaluate whether an output result associated in the associative memory is a desired result or answers for a purpose (**SAMANN**, Fig. 3.2; EN: output set in reference to Vdd); and an output signal of said value judgment device is used for control of whether to transfer the associative data held in said first associative data memory to said plurality of second associative data memories (**SAMANN**, Fig. 3.2; EN: state input of neuron i achieves flow; Vdd sets value for judgment).

Claim 9

SAMANN teaches said value judgment device receives part of the data in said plurality of second associative data memories to evaluate whether a plurality of pieces of associative data held in said plurality of second associative data memories are consistent with each other (**SAMANN**, Fig. 3.2; EN: the capacitor is the value judgment device and consistency is determined by the voltage accumulated across C1); and an output signal from said value judgment device is used for control of whether to transfer the associative data held in said second associative data memories to said first associative data memory (**SAMANN**, Fig. 3.2; EN: if the output signal from C1 is not of sufficient value, no data will transfer).

Claim 10

SAMANN does teach a plurality of second associative data memories connected to said first associative data memory and having a function to hold a plurality of patterns of the symbol pattern on said first associative data memory as required (**SAMANN**, Fig. 3.2; EN: a grouping of secondary associative data memories will support the storing of patterns); a first value judgment device receiving some of the signals of said first associative data memory and outputting a signal for determining whether the pattern on said first associative data memory is worth holding on said second associative data memory (**SAMANN**, Fig. 3.2; EN: value will be outputted if threshold is exceeded at C1); and a second value judgment device receiving part of the data within said second associative data memories and having a function to determine whether the plurality of symbol patterns held in said second associative data memories are consistent with

each other (**SAMANN**, Fig. 3.2; EN: a second Synaptic Circuit will have another threshold to which a comparison can be made).

SAMANN does not teach a chaotic associative memory including a raw neuron group as collection of raw neurons implementing actions with the outside world like sensory organs or muscles, and a symbol neuron group as a collection of symbol neurons serving as sources of information processing within the computer. CAM teaches a chaotic associative memory including a raw neuron group as collection of raw neurons implementing actions with the outside world like sensory organs or muscles, and a symbol neuron group as a collection of symbol neurons serving as sources of information processing within the computer (**CAM**, page 3). It would have been obvious to one of ordinary skill in the art at the time of the invention to create a chaotic neural network by assembly of neurons with inputs. The modification would have been obvious because one of ordinary skill in the art would have been motivated to seek improved functionality through assembly of simulated biological models.

SAMANN does not teach a first associative data memory directly connected to the symbol neuron group of said chaotic associative memory and having a function to temporarily hold a symbol pattern represented by states of neuron signals of said symbol neuron group. CAM teaches a first associative data memory directly connected to the symbol neuron group of said chaotic associative memory and having a function to temporarily hold a symbol pattern represented by states of neuron signals of said symbol neuron group (**CAM**, page 2; page 4, lines 1-4; Fig 2). It would have been obvious to one of ordinary skill in the art at the time of the invention to create storage

related to processed data or symbols. The modification would have been obvious because one of ordinary skill in the art would have been motivated to seek processing by storing t-1 values.

Claim 11

SAMANN does teach a working memory portion including a symbol stage having a function to temporarily store and hold said common symbol pattern, all said specific symbol patterns and a state pattern from said associative memory portion and also having a function to temporally integrate an activation value for each symbol neuron to modulate its fining threshold value in accordance with the integral, a plurality of working memories having a function to hold pattern information held in said symbol stage for a prescribed period of time, and a control sequencer generating a state pattern signal for use in defining directivity of association, invalidation of each input information, invalidation of each associative output, or directivity of each symbol signal in accordance with an external object signal and applying the generated signal commonly to said associative memories (**SAMANN**, page 1, lines 13-28; page 2, lines 1-26; Fig. 3.1; EN: external signal IselS functions as a control sequencer); and a value judgment network portion including a result determination network receiving some of the pattern signals of said symbol stage in said working memory portion and having a function to evaluate at least whether a result associated in said associative memory portion answers for a purpose and thus to determine whether to newly transfer the symbol pattern held to said working memory, and a consistency determination network receiving some of the pattern signals from said working memories and having a function

to determine whether a plurality of symbol patterns held in said working memories are consistent with each other, and, according to the value evaluation, to cause a control sequence to develop into an actual operation (**SAMANN**, page 1, lines 13-28; page 2, lines 1-26; page 3, lines 11-14; Fig. 3.1; EN: Vref and related comparator function as a value judgment network; external signal IselS functions as a control sequencer; learning is synonymous with consistency determination network); each said symbol neuron group including, between itself and said working memory portion, a portion where a state pattern signal common to all the memories is input, a portion. where a common symbol pattern is input/output, and a portion where a specific symbol pattern for each memory is input/output (**SAMANN**, page 1, lines 13-28; page 2, lines 1-26; Fig. 3.1; EN: to one of ordinary skill in the art, all neural networks have a network of neurons wherein some neurons act as input and some act as output); said plurality of working memories having a function to have values indicating the degrees of activation for information held in respective said working memories, the degree of activation having a mechanism to be attenuated with a certain time constant and at the same time to be increased/ decreased by a prescribed amount in accordance with a condition of said control sequence (**SAMANN**, page 1, lines 13-28; Figs. 3.1, 3.2; EN: degree of activation is represented by the weighting factor; attenuation occurs in the synaptic load circuit; time constant is related to pulse characteristics, i.e. pulse width and frequency); and each of said result determination network and said consistency determination network being formed with a hierarchy-type neural network having a function to improve a value judgment capability through learning, and value signals as outputs from said

result determination network and said consistency determination network being applied to the control sequencer in said working memory portion (**SAMANN**, page 1, lines 13-28; page 2, lines 1-26; page 3, lines 11-14; Fig. 3.1; EN: Vref and related comparator function as a value judgment network; external signal IselS functions as a control sequencer; learning is synonymous with consistency determination network; neural networks are inherently hierarchical).

SAMANN does not teach chaotic associative memory having a symbol neuron group representing an abstractive state and a raw neuron group connected with raw pattern signal inputs from sensory organs like eyes and ears or raw pattern signal outputs to muscles like vocal muscle and those of hands and legs or secretory organs for a specific role to implement an interface with the outside world, and relating a raw pattern from various sensory organs to an abstractive, specific symbol pattern formed based on a common symbol pattern through learning to implement complicated association including correlation between the chaotic associative memories. CAM teaches chaotic associative memory having a symbol neuron group representing an abstractive state and a raw neuron group connected with raw pattern signal inputs from sensory organs like eyes and ears or raw pattern signal outputs to muscles like vocal muscle and those of hands and legs or secretory organs for a specific role to implement an interface with the outside world, and relating a raw pattern from various sensory organs to an abstractive, specific symbol pattern formed based on a common symbol pattern through learning to implement complicated association including correlation between the chaotic associative memories (**CAM**, page 3; EN: equations record

abstract concepts). It would have been obvious to one of ordinary skill in the art at the time of the invention to create a chaotic neural network by taking a dynamic system which has a dense collection of periodic points, is sensitivity to the initial conditions and is topological transitive and make adjustments internal to the neural network and the coupling coefficients. The modification would have been obvious because one of ordinary skill in the art would have been motivated to seek improved functionality by simulating biological models wherein, as an example, an input vector of four independent variables relates to a dependent variable of two variables.

Claim 12

SAMANN teaches directivity of association indicates whether to abstract or objectify said association (**SAMANN**, page 2, lines 9-11; EN: abstract is associated with internal active value and objectify is associated teacher data).

Claim 13

SAMANN does not teaches directivity of each symbol signal indicates whether said common symbol pattern is an input; or output with respect to each said chaotic associative memory. CAM teaches directivity of each symbol signal indicates whether said common symbol pattern is an input; or output with respect to each said chaotic associative memory (**CAM**, page 3; EN: content and directivity are synonymous). It would have been obvious to one of ordinary skill in the art at the time of the invention to create a chaotic neural network by taking a dynamic system which has a dense collection of periodic points, is sensitivity to the initial conditions and is topological transitive and make adjustments internal to the neural network and the coupling

coefficients. The modification would have been obvious because one of ordinary skill in the art would have been motivated to seek improved functionality by simulating biological models and the input is distinctive from the output by its characteristic vector, i.e. 4 independent variables for an input and three dependent variables for an output.

Examination Considerations

8. The claims and only the claims form the metes and bounds of the invention. "Office personnel are to give the claims their broadest reasonable interpretation in light of the supporting disclosure. *In re Morris,* 127 F.3d 1048, 1054-55, 44USPQ2d 1023, 1027-28 (Fed. Cir. 1997). Limitations appearing in the specification but not recited in the claim are not read into the claim. *In re Prater*, 415 F.2d, 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969)" (MPEP p 2100-8, c 2, l 45-48; p 2100-9, c 1, l 1-4). The Examiner has full latitude to interpret each claim in the broadest reasonable sense. Examiner will reference prior art using terminology familiar to one of ordinary skill in the art. Such an approach is broad in concept and can be either explicit or implicit in meaning.

9. Examiner's Notes are provided to assist the applicant to better understand the nature of the prior art, application of such prior art and, as appropriate, to further indicate other prior art that maybe applied in other office actions. Such comments are entirely consistent with the intent and spirit of compact prosecution. However, and unless otherwise stated, the Examiner's Notes are not prior art but a link to prior art that one of ordinary skill in the art would find inherently appropriate.

10. Examiner's Opinion

Paras 8. and 9. above apply. The related documents to the IDS cited above need to be provided in their entirety.

Conclusion

11. The prior art of record and not relied upon is considered pertinent to applicant's disclosure.

- U.S. Patent 5,107,454
- U.S. Patent 5,845,048
- U.S. Patent 6,678,669
- U.S. Patent 5,043,913
- U.S. Patent 5,541,914

12. Claims 1-13 are rejected.

Correspondence Information

13. Any inquiry concerning this information or related to the subject disclosure should be directed to the Examiner, Joseph P. Hirl, whose telephone number is (703) 305-1668. The Examiner can be reached on Monday – Thursday from 6:00 a.m. to 4:30 p.m.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Anthony Knight can be reached at (703) 308-3179.

Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks,

Washington, D. C. 20231;

or faxed to:

(703) 746-7239 (for formal communications intended for entry);

or faxed to:

(703) 746-7290 (for informal or draft communications with notation of "Proposed" or "Draft" for the desk of the Examiner).

Hand-delivered responses should be brought to:

Receptionist, Crystal Park II

2121 Crystal Drive,

Arlington, Virginia.

Joseph P. Hirl

June 8, 2004